Manning Diversified Forest Products
Research Trust Fund
MDFP 24/99

Forest Explorers 1999

1999 – Final Report

By Boreal Wood Centre – Mr. Hugh Seaton
Manning, Alberta
Canada

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Forest Explorers 99

October 28 & 29, 1999
Manning, Alberta

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How Do You Radio Collar a Grizzly Bear??

More Than 500 People Attend Forest Explorers 99

More than 500 people attended the Forest Explorers 99 show in Manning, Alberta, October 28 and 29 to learn about forest ecology and management. The event was the second Biennial Research Show of the Manning Diversified Forest Products Research Trust Fund.

A popular feature of the show was the study on Grizzly Bears in Northwestern Alberta. Dave Moyles, Alberta Environment provided highlights of the new, five-year study.
"The purpose of this work is to conduct a comprehensive review of grizzly bear populations in northwestern Alberta, including critical habitat, movements and ranges." Moyles showed the students how grizzly bears are snared and collared so scientists can track the movements of the bears.

The Trust Fund and the Boreal Wood Centre, Fairview College hosted the show to bring awareness to the complexity of managing the forests which surround us. The show featured the five years and $2.5 million of research sponsored under the Trust Fund. The Trust Fund has supported a total of 55 research projects to date. This growing body of work includes forest products research, tree growth and yield, ecosystems studies, and public awareness on sustainable development and careers in the forest industry.

Forest Explorers 99 featured 13 speakers on a wide range of environmental topics, including caribou, tree genetics, biodiversity, watershed management, and the use of wood products. Some of the University of Alberta's top environmental scientists were on - hand to talk to the students and the general public.

School classes attended from Fairview, Peace River, Dixonville, Manning, Keg River, High Level, and La Crete.

For every cubic metre of timber harvested, Manning Diversified directs $2 into a Trust Fund. This adds up to about $0.5 million per year. The Trust Fund, which is guided by a community - based steering committee, contributes funds to environmental research and various community projects. Manning Diversified Forest Products Ltd. produces dimensional wood products for north American and off-shore markets, and also has a remanufacturing plant which produces specialty wood products such as siding and flooring. This helps to maximize the value we get from our forest resource.

You can get additional summary reports of ***Forest Explorers 99*** by contacting the Boreal Wood Centre, Fairview College at (780) 836 - 3520.

You can find out more about the Manning Diversified Forest Products Research Trust Fund by visiting their website **http://www.mdfpresearch.ab.ca** . The Boreal Wood Centre website is **http://www.agt.net/public/borealw** .

Comments About Forest Explorers '99

- It was worthwhile; should have had all booths manned.
- More food!
- Well attended. (comment from the kitchen staff)
- It was good. I think my students enjoyed it. I did.
- Organisms in the lake was good.
- Make it less like a trade fair and make it more public - advertise more.
- It was good but may have been better if the exhibits were for our age.
- I thought it was good. I think that there could be more youthful presentations.
- This looks neato. It certainly made my morning. More free pop!
- I learned a lot about forestry. If you had more exhibits about animals, it would have been a little more interesting. The food was very good.
- More hands-on projects could improve it.
- It is important because you can learn about the forest and animals.
- I love nature so I think this is great.
- It's my first and I am enjoying the event.
- Excellent - thank you.
- Awesome. A winner.
- It was great. I really enjoyed it. It doesn't need to be improved.
- I enjoyed the career books and the college exhibit.
- Forest Explorers '99 is really neat. I like the things that you can look at and feel.
- I liked the visual effects. It was absolutely fine here.
- Wonderful displays!
- I think it was worthwhile because we had a lot of fun and cool things.
- I really enjoyed the butterfly and moth displays. I like the setup also, it wasn't really crowded. They did a good job on holding it.
- Good, but more hands on.
- Excellent because of the artifacts. Bring more stuff.
- It was a very interesting experience to come to Manning. My first time here. People were very helpful.
- A lot of information to take in all at once. Very well laid out. Two thumbs up!
- Much of the information at displays is written at university level. Is it possible to change written material so it is more understandable to children? Perhaps aim at a grade 8 or 9 reading level.

Feedback from Researchers
Forest Explorers '99

Comments/Suggestions on Forest Explorers '99:

- An excellent opportunity to present information to people. (Many similar comments).
- Excellent endeavor.
- Advise researchers to gear presentations and materials for the school audience, including junior high students.
- Designate a period of time for researchers to attend presentations.
- Show provides opportunity for researchers to place their work within the broader social setting as well as being able to get a better understanding of industry and government's short and long-term needs.
- Invitation to other groups (fish & game clubs, naturalist groups) may boost attendance.
- Tours of selected research sites may have merit.
- Feature articles of on-going research in local papers.

Views on how the Trust Fund operates:

- Impressed with the scope and range of topics MDFP is funding.
- Keep the diversity of the fund.
- Fund is well managed.
- Trust Fund should be more active in identifying the important research needs. Viewed as being very progressive, on the leading edge for research funding.
- Gratifying to work with because of the rapid development possible; best model experienced to date
- To be congratulated on trusting researchers to make a contribution to forest sustainability.
- The Trust Fund should be showcased as a model for other companies.

Research focus for the Trust Fund over the next 3 years:

- Maintain the broad nature of project funding; mix of short and long-term studies.
- Encourage value-added and secondary manufacturing/product development for the region.
- Focus on watershed issues, habitat protection/creation, cumulative effects.
- How to structure harvesting to minimize effects on the landscape.
- Forest ecology and approaches to timber harvest that incorporate natural disturbance concepts and evaluate green tree retention.
- Evaluation/monitoring of how well natural disturbance or ecosystem management approaches to forestry are really working.
- Incentive for increased "pre-treatment" research would be invaluable.
- Continue to foster partnerships with government and to work on multi-stakeholder, funded initiatives.
- Human development and climate change effects; response strategies in silviculture and reforestation.
- Consider linkages with researchers/groups promoting environmentally and economically sound forest practices.
- Would like to see more aboriginal involvement; examination of traditional native uses of the resource.
- Contaminant exchange from forestry to surface waters.

APPLIED FOREST GENETICS RESEARCH AND PRACTICAL TREE BREEDING TO ENHANCE GROWTH, YIELD, TIMBER QUALITY AND PEST HARDINESS OF FUTURE FORESTS IN THE PEACE REGION

Narinder Dhir, Leonard Barnhardt, John Quinn, Christine Hansen and Run-peng Wei
Alberta Tree Improvement & Seed Centre, Land and Forest Service, Smoky Lake, Alberta

Introduction

This long-term research project started in 1995 with funding from the MDFP Research Trust Fund. Work is done in co-operation with the University of Alberta, North Peace Applied Research Association, British Columbia Ministry of Forests and regional forest companies. The major objectives include:

- development of research and scientific information on regional genetic variation, inheritance patterns, trait relationships and genotype-environment interactions of white spruce and lodgepole pine;
- development and release of regionally adapted superior varieties of conifer tree species to enhance forest production and timber quality in the Peace region;
- carrying out conservation in perpetuity, of selected genetic stock from the region in the provincial clone banks and seed germplasm archive.

Field research installations for the project are located near Keg River, Hines Creek and Manning. The project work is divided into a number of research studies. Three examples of research studies in progress are described below.

Geographic Variation of White Spruce

White spruce is a widely distributed species throughout Canada. It is characterized by a large amount of genetic variation, which is related to geography and climate. The objective of this study is to gain an understanding of this geographic variation in white spruce populations from throughout Alberta. In order to achieve this, 18 and 21 year field assessments were carried out for survival, growth and pest susceptibility on a Genetics test site near Keg River. Results were as follows:

- there is large variation among seed sources for survival, plant health, growth and stem quality;
- best performance was shown by a 'local' seed source;
- latitude and elevation of the seed source origin explained a significant proportion of observed variation.

This information will be useful for developing seed transfer models for wild seed deployment and in understanding the population structure of genetic variation and adaptation of white spruce to physical environments and climate in the Peace Region.

Genetic Variation and Inheritance of Economic and Adaptive Traits

Genetic variation is the basis for species evolution as well as selection for breeding of improved varieties. Knowledge of the mode of inheritance of traits is essential in developing effective breeding programs. 11-year field assessments for survival, growth and pest resistance (white pine weevil) was carried out on the progeny of 69 superior white spruce parents also planted on the Keg River test site. The results are summarized as follows:

- significant variation was found among families in survival, growth, plant health and weevil damage;
- infection of families ranged from 0% to 34% and resistance to weevil damage was highly heritable indicating substantial opportunity for weevil resistance breeding;
- height growth was found to be moderately inherited and a mathematical model developed with this information predicts that about a 10% increase in height growth performance is achievable in the first generation of breeding.

Manning Area Woodlot Research and Demonstration Project

The Alberta Tree Improvement and Seed Centre is providing scientific and technical support for this project. The research component of the project includes both species and seed source testing in order to identify suitable genetic material for a woodlot program in the Manning area. A research trial was established at the Gurtler Woodlot site in 1998 and is being monitored for survival, growth and plant health.

SELECTING, PROPAGATING AND CONSERVING SUPERIOR PARENT TREES FOR BREEDING IMPROVED VARIETIES FOR REFORESTATION

Leonard Barnhardt, John Quinn and MaryAnn Mochulski
Alberta Tree Improvement and Seed Centre, Land and Forest Service, Smoky Lake, Alberta

Selecting Wild Parent Trees for Breeding Improved Reforestation Varieties

- After the identification of a need for genetically improved reforestation stock, climatic and ecological information are reviewed and an area of uniform environment (breeding region) is delineated as a target area for the breeding program and deployment of improved varieties.

- Wild parent trees having observed desirable traits are selected from within the breeding region to be included in the breeding program; this helps ensure that the improved varieties will be well adapted when deployed in the same area.

- The process of selecting parent trees begins with a systematic search within the breeding region for stands having a high proportion of trees with desirable characteristics. An effort is made to identify stands throughout the breeding region so that all areas are represented, while at the same time maintaining an adequate distance between stands to minimize relatedness.

- Selected superior stands are then priorized and the best tree within each stand is selected to be included in the genetic testing and breeding program.

- Desirable traits for selected parent trees include superior height and growth rate, freedom from any signs or symptoms of disease, pests or climatic damage, straight bole form with minimal taper, a narrow and thrifty crown with good natural pruning and a flat and fine branching habit.

Materials Collection, Grafting and Genetic Testing of Superior Parent Trees

- Scions (shoots from the upper crown) for grafting, are collected from superior parent trees by either shooting off the treetop with a rifle or collection by helicopter.

- Seed for establishing genetic tests, as well as wood samples for determining wood quality of parent trees, are also collected.

- The scions are packed and shipped to the Alberta Tree Improvement & Seed Centre where they are grafted onto rootstock to duplicate the genetic material of the parents.

- Once established, the grafts are outplanted into orchards to produce genetically improved seed for rearing reforestation stock and established in clone banks as a conservation measure.

- Seed collected from wild parents is used to establish field trials located within the breeding region to test the genetic worth and breeding value of selected parent trees; this information can then be used to determine the parental composition of future orchards and to direct future breeding of improved varieties for reforestation.

Battle River Pioneer Museum

The Museum is located 1 km. East on Highway #691 just east of the Town of Manning and consists of a large main building, cabin, post office, blacksmith shop, Church, windmill and machine sheds.

There is a large collection of agricultural and other equipment - including horsedrawn, about 50 tractors, implements and caterpillars.

The collection features a full-mount albino moose, timber wolf, buffalo calf, other wildlife, Windigo moose skull, locked caribou horns, rocks, books, household items, hand-carved one piece wooden necklace, small engines, clothing, office equipment, Hudson's Bay calendar collection, buggies, and much more. Also on display are two burls, one weighs 419 pounds; a stump with five trees growing from it and a length of tree which goes from one to two trees and back to one.

Sunday of Heritage Weekend there is an Antique Tractor Parade with 40 tractors running, and some caterpillars. There is threshing, baling, shingle mill, shingle edger, log plane and ropemaking. A food booth is in operation and there are door prize draws.

The Museum is open: May 15 - September 15 from 1 - 6 P.M. Daily
July & August 10 A.M. - 6 P.M. Daily
By appointment - Call 836-3114, 836-2180

We appreciate the community support both in donations, donations-in-kind and volunteer hours (about 3,000 per year).

Mary Jaeger
Secretary - Treasurer
836-2180

Biodiversity In Harvested Areas In Relation To The Dispersion Of Standing Live Trees And Snags: 1998/99 Year - End Report

By: Jim Schieck, Susan Crites, Lui Marinelli, Troy Sorensen, Steve Bradbury, Christine Gray
Alberta Research Council, Vegreville, Alberta

In this project, we are evaluating the extent to which biodiversity in harvested areas is affected by the size, number, and spacing of tree clumps that are left after harvest. Twelve experimental cut-blocks were created in each of two study areas. One experimental area is in pine/spruce-dominated forests near Whitecourt, Alberta, and the other is in aspen-dominated forests near Grande Prairie, Alberta. Within each of the cut-blocks in the experimental areas, 3% of the pre-harvest merchantable trees were retained in clumps. One third of the experimental cut-blocks had clumps with a mean of 0.64 ha, one third had clumps with a mean of 0.14 ha, and one third had clumps with a mean of 0.04 ha. This research complements on-going research at the Alberta Research Council, the University of Alberta, the Network of Centers of Excellence, and forest industries throughout the Alberta by evaluating how residual clump size and spacing affects biota rather than evaluating how differences in amount of residual materials affects biota. All residual tree clumps evaluated in this study can be implemented by forest companies that leave some canopy trees in their harvest blocks. This project started April 1997 at which time biota were surveyed in the treatment areas prior to harvest. During the winter 1997/98 the experimental cut-blocks were harvested. Some of the biota in the post-harvest cut-blocks were re-surveyed during 1998 with the remainder surveyed during 1999. Although the primary focus of this project is on the biotic community, we also evaluate the fall-down rates of trees and snags that are left standing in the experimental areas.

Within both study areas we categorized the experimental stands into four groups to reduce variance and increase statistical power of our tests. Composition and density of trees and snags, volume of downed woody material, bird communities, and bat abundance varied among the stand groups pre-harvest. After accounting for differences among stand groups, however, forest structure and biotic communities did not vary among treatments. Thus, differences we found among treatments after harvest can be attributed directly to variation in size, number and spacing of tree clumps retained at harvest.

During 1998 we conducted comprehensive surveys of the experimental cut-blocks for trees, snags, downed woody material, bats, beetles, and conducted cursory surveys for birds. Fall down rates of trees were low in both study areas (< 15% and 5% in the Whitecourt and Grande Prairie study areas respectively) but significantly lower in the large clumps than in the smaller clumps. More downed woody material was present in cutblocks with small clumps than in cutblocks with large clumps. For both beetles and birds, the communities in large clumps were more similar to those in unharvested forest than were the communities in small clumps. Bat abundance, however, did not differ among treatment types. Patterns were consistent for both the Whitecourt and Grande Prairie study areas, and suggest that cutblocks with large clumps retain more characteristics of unharvested forest than do cutblocks with small clumps.

During 1999 we conduct comprehensive surveys of the experimental cut-blocks for bats, herbs, shrubs, and birds. This data is being analyzed and will be in a final report March 2000. In addition, field tours will be conducted in the experimental cut-blocks, and verbal presentations will be given to all funding partners of the project by March 2000. The final report will include a summary chapter describing similarities and differences among biotic groups that occurred as a consequence of retaining trees in many small clumps versus few large clumps at harvest.

Biodiversity Monitoring Program

Phase 1. Program Development

Duration: January 1997 - December 1999

Key Words: Alberta, biodiversity, ecosystem integrity, fire management, forestry, monitoring, petroleum development, protected areas

Goal

To develop and test a program that can detect changes in biodiversity that may be caused by human activities, particularly forestry, fire management, and petroleum development.

Objectives

1. Develop a list of aquatic and terrestrial attributes to be sampled at specified locations within Alberta's forested natural regions. These attributes are intended for use in detecting whether changes in biodiversity are occurring that may be caused by human activities, particularly forestry, fire management, and petroleum development.

2. Develop a plan for the periodic sampling of these attributes, including spatial arrangement of sample locations, sampling frequency, and field sampling methodologies.

3. Develop a plan for the periodic reporting of landscape composition and pattern within Alberta's forested natural regions using remote sensing technology.

4. Complete an analysis of program effectiveness (i.e., statistical power to detect change in monitored attributes) for a range of financial investments.

5. Prepare a plan for the coordination, administration, and funding required for the successful implementation of such a program.

6. Prepare and conduct a test implementation and evaluation of the program. This will involve field data collection followed by an assessment of the feasibility of the proposed protocols, and the statistical properties of the monitoring data.

Description

A forest monitoring program is being developed by land management organizations in Alberta to assist them in meeting commitments to the conservation and monitoring of biological diversity. When completed, it will be available for coordinated implementation by the forestry sector (government and industry), national parks and other protected areas, and the oil and gas sector. The need for such a program has

become apparent as government agencies and private industry embrace the concept of adaptive management, which requires the monitoring of desired management outcomes, including biodiversity conservation. A comprehensive, efficient monitoring program that uses a common methodology over a sufficiently broad range of jurisdictions will be of great assistance to resource managers today and in the future.

Reports and Products

- Schneider, R.S. 1997. Ecological diversity monitoring framework. Discussion paper prepared for the Biodiversity Monitoring Working Group (August 1997).
- Lee, P. and S. Hanus. 1998. Criteria and indicators for monitoring biodiversity in Alberta's forests: Part I: Review of legislation, policies, external agreements, and programs. Progress completion report prepared for Alberta Environmental Protection by the Alberta Research Council, Vegreville, AB. 123 pp.
- Monitoring Forest Biodiversity in Alberta: Workshop Proceedings (March 30-31, 1998).

Contact

Daniel Farr, Program Coordinator, c/o Foothills Model Forest, Box 6330, Hinton, Alberta, Canada, T7V 1X6, ph. 780-865-8385, Daniel.Fa @telusplanet.net
http://www.fmf.ab.ca/bm.html.

Partners

Ainsworth Lumber, Alberta Conservation Association, Alberta Environmental Protection, Alberta-Pacific Forest Industries, Inc., Alberta Research Council, Alberta Science and Research Authority, Canadian Forest Products, Ltd., Canadian Forest Service, Daishowa-Marubeni International Ltd., Foothills Model Forest, Manning Diversified Forest Products Research Trust Fund, Millar-Western Industries, Parks Canada, Prince Albert Model Forest, Provincial Museum of Alberta, Weldwood of Canada Ltd., Weyerhaeuser Canada Ltd.

Boreal Grizzly Bear Project

Natural Resources Service - Alberta Conservation Association, with support from the MDFP Research Trust Fund, is undertaking a (5) year project to study grizzly bears in the Northwest Boreal Region. The purpose of this work is to conduct a comprehensive review of grizzly bear populations in northwestern Alberta, including critical habitat, movements and ranges. It is anticipated that this information will assist managers in identifying and protecting critical grizzly habitat areas from timber harvesting and other industrial activities.

The purpose of the Boreal Grizzly Bear Project is:

1. To determine movement patterns and ranges of grizzly bears in Alberta's boreal forest.
2. To identify areas and habitats important for grizzly bears, including denning areas.
3. To collect baseline data required before doing DNA-based population estimate surveys.
4. To incorporate data on habitats and areas critical to grizzly bears into landuse management.

Fieldwork started in August 1999 with 14 snaring sites set up in the Hotchkiss - Meikle River areas. Eight bears were caught; four grizzly bears and three black bears (one black bear was caught twice). Three grizzly bears and one black bear were outfitted with telemetry collars.

Relocation efforts were started in late August and have continued on a weekly or bi-weekly basis (weather permitting). A database has been created to store all data concerning locations, habitat descriptors of each site, dates, and data on each bear captured. Relocations will continue until the bears go into dens.

The study should also provide specific plans to reduce man-bear conflicts for people who work in the forest.

Actions to reduce this potential for conflict are worth pursuing for both our own sake and for a species with an estimated population of only 800 for the entire province. The grizzly is a magnificent creature and yet our true knowledge of this animal in Alberta remains fragmented and incomplete.

Boreal Wood Centre

"Promoting the Wise Use of Timber Resources in the Boreal Forest"

CONTACT

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LOCATION

Town of Manning, Alberta

ESTABLISHED

March 1996

PARTNERS

3 core partners

- ***Manning Diversified Forest Products Ltd.***
- ***K P Wood Ltd.***
- ***Fairview College***

3 associate partners

- The Town of Manning
- Alberta Environmental Protection
- Peace River School Division

Overview

The Boreal Wood Centre was the vision of a small number of industry leaders and educators who wished to promote environmental education and economic benefits for the citizens of northern Alberta. The program is a partnership of the private sector, the education system, and the community and has an ambitious goal - "to promote the wise use of timber resources in the boreal forest."

Objectives

- To promote environmentally sound uses of forest resources through research and public awareness.
- To help develop a technically competent workforce in the forest products sector of northwest Alberta.

Program Activities

- Public awareness of environmental research.
- Training and development in agro-forestry.
- Custom high school curriculum and student scholarships.

Achievements

- Access for residents in remote locations to "high tech" learning.
- Leveraging of funds in support of research and training.
- Provincial - level leadership in the field of wood residues.

Innovation

- A community - based project in a remote location.
- Catalyst for the involvement of industry, academia, government, and entrepreneurs.
- Innovative, grassroots education programs.
- The partners are committed to broad societal benefits.

Benefits

Education

- Recognized by industry as a deliverer of technical training.
- New entrepreneurial opportunities for the College.
- Unique marketing and public relations opportunities.

Industry

- Recognized as leaders in environmental stewardship and technical skills training.
- A more reliable, sophisticated workforce.
- A focal point for community programs and donations.
- The association with Fairview College provides a regional scope and access to marketing and public relations.

Effects of Fire and Harvest Disturbance on Small Mammal, Bird, and Vegetation Diversity in Three Age-Classes of Conifer Dominated Boreal Mixedwood Forest

by Lisa Verbisky

Due to ever increasing demands on the resources of the boreal forest, public and research interest has been piqued by the difficulties that arise in trying to maintain integrity of the boreal ecosystem while allowing the many economic, social and recreational opportunities to continue. The idea has been put forth that timber harvest practices using a natural disturbance regime as a template for management strategies will maintain forest integrity, and thus, biological diversity.

Disturbance, such as fire, is a natural part of the boreal forest and plays an important role in determining ecosystem structure, composition and function. Before fire suppression, the boreal forest was dominated by a fire-disturbance regime to which each species is adapted. Presently, large sectors of Alberta's boreal forest are subjected to large scale timber harvesting. Fire suppression and clearcut harvest practices are changing the type of disturbance dominating the landscape. The effect on wildlife and vegetation diversity is not known.

The natural disturbance approach to forest management is well supported by many theoretical papers, but largely remains an untested theory. Research is needed to first document the characteristics of fires so that management guidelines can be formulated and implemented. This information must be complemented by a test of the basic assumption of the natural disturbance approach to forest management. That is, forest management that conserves forest structure based on a natural disturbance model will maintain forest function, and thus, species diversity.

The present study examined vegetation and structural characteristics of fire disturbance in three age-classes of white spruce dominated stands. These characteristics were compared to three age-classes of harvest disturbed stands. Instead of examining the variation of fire regimes, the variation found in fire disturbance was controled for by selecting burn stands of a specific age, a certain size and intensity, and with a particular pre-disturbance vegetation type. By holding these general variables constant, conclusions meaningful to forest management could be drawn about where the differences lie between harvest and fire disturbance at the stand scale.

The purpose of this study was to document fire characteristics, determine if and how these characteristics differed from harvested stands, and determine if the integrity of the forest was conserved, or at least recovered, by comparing species diversity between disturbance types as time from disturbance increased. This research will provide resource management agencies and the forest industry with the information needed to make sound management decisions on how to maintain structure and function at the stand scale through harvest site manipulation.

Differences were found between burn and harvest stands in terms of vegetation diversity. However, differences generally disappeared as time from disturbance increased. Small mammal diversity was largely unaffected by harvesting. The abundance of several bird species and overall species composition of birds was affected by harvesting as compared to fire disturbance.

The results suggest that changes to management need to be made in order to conserve ecosystem function. The vegetation data gathered on burn stands will provide the necessary information to develop harvest guidelines based on a natural disturbance approach to harvest management. Implementation of these guidelines must be followed by a monitoring program to determine if conservation of ecosystem function will be maintained.

Effects of Forest Management on the Genetic Diversity of Lodgepole Pine and White Spruce using Molecular Markers: Microsatellites and Enzymes

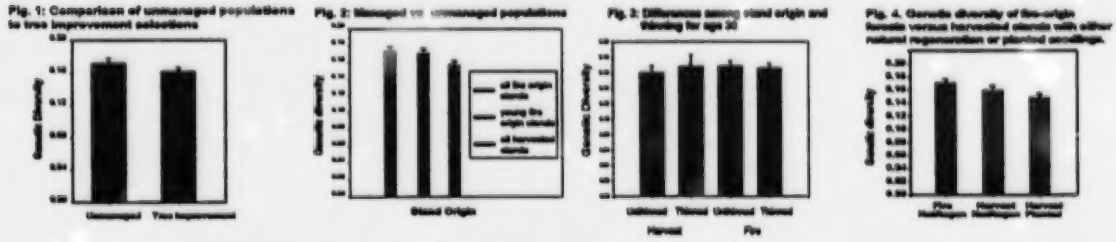
Ellen Macdonald[1], Ross Hodgetts[2], Barb Thomas[1], Donna Cherniawsky[1], Tony Brown[2],Brett Purdy[1].
[1]Department of Renewable Resources, [2]Department of Biological Sciences, University of Alberta, Edmonton, AB., Canada

Rationale for Research: Lodgepole pine and white spruce are important tree species in Alberta forests, ecologically and commercially. Genetic diversity is important for ensuring the long-term survival and fitness of a species by providing the genetic variation from which future generations can adapt to changing conditions. Therefore, maintenance of genetic diversity is an important aspect of conservation. Molecular markers have become increasingly important in the assessment of genetic diversity in forest trees as well as our understanding of the underlying mechanisms which influence this diversity and its conservation. Microsatellites are one of many methods used to do DNA fingerprinting. Enzymes are another valuable molecular marker because their genetic basis is easily interpreted after their separation in the presence of an electric current. Since both microsatellites and enzymes exhibit a lot of variability from one individual to another they have many research applications for forest trees.

Microsatellites: The focus of this research is the development of microsatellite markers for lodgepole pine and white spruce. Microsatellites are short sequences of repetitive DNA. By visualizing the sizes of microsatellite DNA bands on a gel we can 'fingerprint' individual trees. The markers we are making can be used for future research in the following areas: 1) genetic diversity in natural populations or nurseries; 2) identification of parents of trees; 3) assessment of pollen dispersal and pollen contamination in orchards.

Enzyme Analysis: Forest management may influence genetic diversity of forest trees. We are investigating the effects of forest management on stands of lodgepole pine and white spruce in west-central Alberta. Our findings may aid in planning conservation programs and may influence the way forest are managed. Our goals are: 1) to understand the different levels of genetic diversity that exist in natural forests; 2) to examine the effects of forest management on genetic diversity; 3) to examine the effects of tree improvement on genetic diversity.

RESULTS



Conclusions - There were no significant differences in genetic diversity: 1) among regions; 2) among ages; or 3) due to thinning. Managed (vs unmanaged) stands had lower genetic diversity. Tree improvement selections had slightly lower diversity than unmanaged stands.

Sponsors - Manning-Diversified Forest Products, Weyerhaeuser Canada Ltd. (Grande Prairie), Weldwood of Canada Ltd. (Hinton), Millar Western Industries Ltd., NSERC, Foothills Model Forest, Daishowa-Marubeni International Ltd., Canadian Forest Service, Canadian Forest Products Ltd., Alberta Newsprint Company.

EMEND Hydrology Study: How do changes in forest vegetation affect soil water and soil temperature?

Graham Hillman, Cecilia Feng, Bruce Robson and Greg Taylor

Northern Forestry Centre, Canadian Forest Service

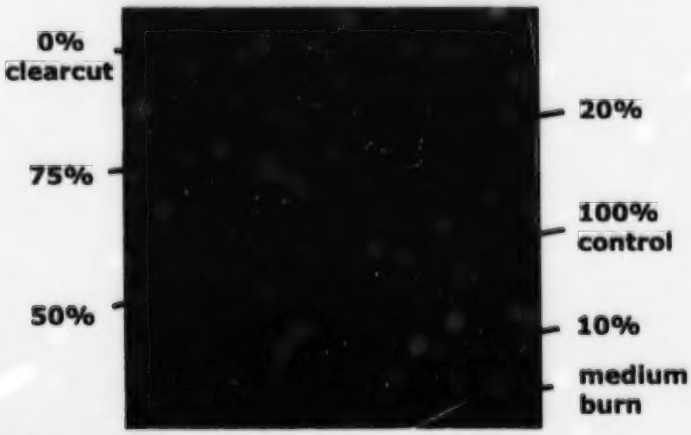
Where does the soil water go?

Overview

- Need for information on the effects of fire and timber harvesting on: soil water, soil temperature and evapotranspiration and on plant-soil relationships in the boreal forest.
- Current study conducted through EMEND (Ecosystem Management by Emulating Natural Disturbance), a multi-agency and multidisciplinary project.
- **Study Objectives**: **1)** Determine the effects of fire and timber harvesting on soil water and temperature. **2)** Relate forest regrowth to seasonal soil temperature and soil water conditions.

The Experimental Site

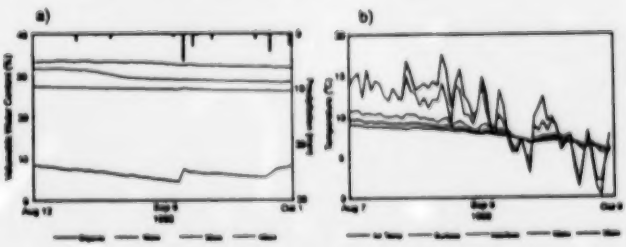
- **Location**: 90 km NW of Peace River, Alberta.
- **Treatments**:
  10-ha blocks in a coniferous dominant stand. Timber harvesting with 0, 10, 20, 50, 75 and 100% trees uncut (residual). Medium intensity burn.



Measurements

- Soil temperature and soil water at different depths on cut and treed areas.
- Groundwater levels and hydraulic conductivities.
- Topographic and vegetation surveys.
- Precipitation and evapotranspiration.

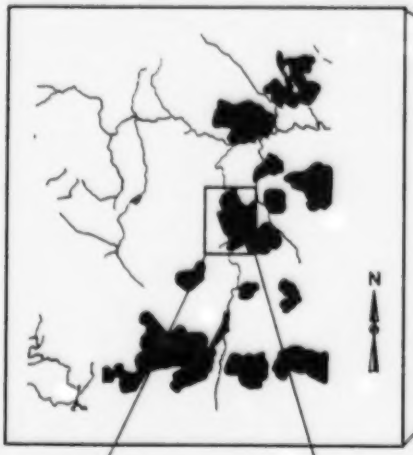
Preliminary Results



Mean volumetric soil water content (a) and mean daily air and soil temperatures (b) within the control compartment of the coniferous dominant stand, August to October, 1998.

EMEND Experimental Site

Well Installation
(Clearcut)



ALBERTA

Datalogger
Installation
(Clearcut)

Conifer Dominant Stand

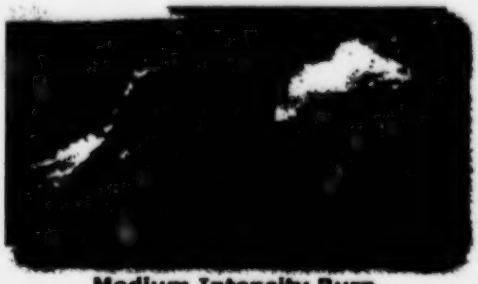
Soil
Water
Sensor
Calibration

75% Residual

10% Residual

Soil Profile

Burn Ignition



Medium Intensity Burn

The financial support, both direct and indirect, of Canadian Forest Products Ltd., Daishowa-Marubeni International Ltd. and Manning Diversified Forest Products Research Trust Fund is gratefully acknowledged. The encouragement and assistance of Dr. John Spence and his colleagues, University of Alberta, are also greatly appreciated.

Canada

First Nation Forestry Program
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The five-year First Nation Forestry Program (FNFP), initiated in 1996, is a national program created to help improve economic conditions in status Indian communities, with a primary emphasis on sustainable forest management. Jointly funded by the Canadian Forest Service (CFS) and Indian and Northern Affairs Canada (INAC), the $24.9 million program is administered through the various CFS regional offices. The Northern Forestry Centre, CFS, Edmonton, is responsible for program delivery in the provinces of Alberta, Manitoba, and Saskatchewan and in the Northwest Territories.

The FNFP has four objectives: (1) to enhance the capacity of First Nations to operate and participate in forest-based businesses and increase the number of long-term jobs in forestry for First Nation members; (2) to increase First Nation cooperation and partnerships; (3) to investigate other mechanisms for financing First Nation forestry development; and (4) to enhance the capacity of First Nations to sustainably manage reserve forests.

Under the program, joint management committees have been established in each province and territory to receive and review proposals, and make decisions on project funding and administration. These management committees normally consist of representatives of First Nations, CFS, and INAC, however other levels of government and/or industry representatives may also participate. Since 1996, about projects have been approved within the four jurisdictions serviced by the Northern Forestry Centre, for a combined value of $1.5 million. This level of funding was further supplemented by First Nation and other partner funding support, more or less on an equal basis. .

Approved projects include the preparation of forest management plans, completion of traditional land use studies, assessments of forestry business opportunities and training of forest fire fighters, log builders, silviculture workers, timber scalers and sawmill operators. Several successful conferences have also been held throughout the region. As the program prepares to enter the final year of its current five-year commitment, efforts by First Nation leaders and others are presently underway to have the program extended beyond March, 2001, as much more work remains to be done. To date, demand for assistance from the FNFP by First Nations has been high, and requests for funding typically exceed the amount of funding available. Partnerships with other groups and programs can and have helped offset some of the funding shortfall to date. Where appropriate, First Nations are encouraged to seek the support and assistance of the forest industry and other interested partners and/or programs.

Natural Disturbance

foothills model forest
A growing understanding

Weldwood's FMA

Photo by: E. Finlayson, Dominion Forest Service

Athabasca Valley 1911

Photo by: John Hickey, Weldwood of Canada

Athabasca Valley 1997

Jasper National Park

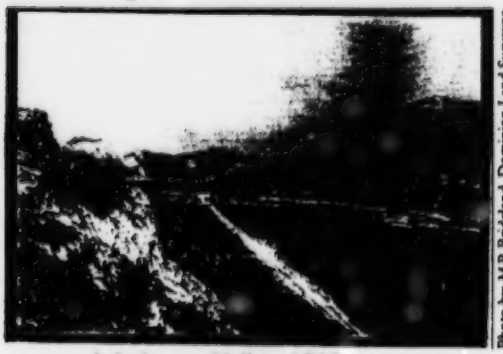


Photo by: M.P. Bridgland, Dominion Land Surveyor

Athabasca Valley 1915

Photo by: J. Rhemtulla & E. Higgs, University of Alberta

Athabasca Valley 1996

Our Landscape

At the beginning of the century, two gentlemen captured the landscape of the Athabasca Valley in black and white photographs. Over 80 years later, a graduate student and a retired photographer recaptured these same views. The visible differences in photographs demonstrate how our forests and landscapes continually change. Understanding these changes will allow us to build on our heritage and better plan for our future.

Historically, fires have been a frequent and natural agent of change and renewal in the forests of the mountains and foothills of west-central Alberta. Aboriginal people lit fires in the river valleys of Jasper National Park to open grasslands for grazing wildlife. In the 1880s, smoke from the huge fires in western Canada at times darkened the skies of London, England. Throughout the 1900s humans suppressed fires that would have naturally occurred.

Our Research

Foothills Model Forest's Natural Disturbance program is based on the assumption that approximating natural disturbances in land management practices is the best possible means of maintaining biodiversity. The program analyzes and interprets how disturbances (fire, wind, disease) affect the landscape and forests.

Our Partnerships

The shared landscape between our partners tells a similar story. Foothills Model Forest landbase partners are Alberta Environmental Protection, Jasper National Park, and Weldwood of Canada Limited. These partners focus on their common goals and know that nature does not recognize boundaries. Their commitment to research and its implementation will ensure that future generations are able to build on our heritage.

For more information visit our website at www.fmf.ab.ca

High School Research Projects
Boreal Forest Education Award Program

The *Boreal Forest Educational Award* is an incentive for high school students to expand their knowledge and interest of the boreal forest.

> *The purpose of the award is to assist students in enhancing their knowledge and appreciation of the ecological, social, cultural and economic links we share with the boreal forest.*

Funds are made available to high schools by the Manning Diversified Forest Products Research Trust Fund. The program is administered by the Boreal Wood Centre. Proposals are accepted for projects in biology, social studies, career and technology studies and forest products development in industrial arts.

Projects Funded in 1998 - 99

Tending and Research of Tree Seedlings

Paul Rowe High School, Manning
Gordon Nelson

Students at Paul Rowe High School planted 1,000 seedlings last year as part of the Gurtler Research and Demonstration Woodlot. The students used five soil treatments (eg., cultivation and herbicide) and five tree treatments (eg., planting the seedlings while frozen). The project informs students about tree handling and site preparation, and gives the students experience in experimental methods.

This year, the students will replant the various trees that died, install protective covers around the trees, and document the research results.

Water Quality Study

Dr. Mary Jackson School, Keg River
Mike Larsen

High School students in Biology, Chemistry, Science, and Forestry at Dr. Mary Jackson School will join together in a study of water quality in the Keg River area. The students will use standardized tests to determine the role water quality plays in sustaining life in a northern forest. The students will collect samples from wells, dugouts, rivers, creeks, lakes, ponds, sloughs, and marshes.

Agro – forestry Nursery Business

Dixonville School
Kelly Alcorn

Dixonville school will start a nursery business consisting of planting, maintaining, harvesting, and selling bedding plants and tree seedlings. The project will expose students to the same challenges as people in agriculture, forestry, and business. Dixonville School will start with a small program, and expand based on the profits from sales. The long-range plan is to have a greenhouse that could operate through the winter.

Model Home Construction

Paddle Prairie School
Maurice Moffat

The Grade 10 - 12 CTS students will build a model of a 2 - 3 bedroom house to show their understanding of products from the boreal forest. The project will give students an appreciation of how timber is converted into lumber and other forest industry products. Students will enhance their knowledge of the building trades.

Chainsaw Lumbermaking and Solar Kiln Drying

Peace River High School
Mark Ladd

The forestry program at Peace River High School will learn about the harvesting, sawing, and drying of solid wood through a one credit CTS module. Learning modules include - sawlog selection, evaluating how to maximize board feet in a sawlog, calculating lumber grades, stacking for air drying, solar kiln construction, and kiln drying. Two trips will be made to local mills to observe commercial production. While students will not operate the chainsaw, they will receive a demonstration on safe operating practices. The solar kiln is based on a design by Curtis Johnson of Madison, Wisconsin.

Hotchkiss River Mixedwood Timber Demonstration Area
Alternatives to Clearcutting in Aspen-Spruce Forests in Northwestern Alberta

D.A. MacIsaac; S. Lux; D. Sidders; I. Edwards
Natural Resources Canada, Canadian Forest Service

At a site near the Hotchkiss River in northwestern Alberta, forest researchers and collaborators are developing new approaches to natural regeneration and harvesting systems for Alberta's boreal mixedwood forests. As part of a national network of research sites called FERNS (Forest Ecosystem Research Network of Sites), the Hotchkiss River Mixedwood Timber Harvesting Study involves partners Daishowa-Marubeni International Ltd., Manning Diversified Forest Products Ltd., the Forest Engineering Research Institute of Canada, Alberta Land and Forest Service, and the Canadian Forest Service (CFS).

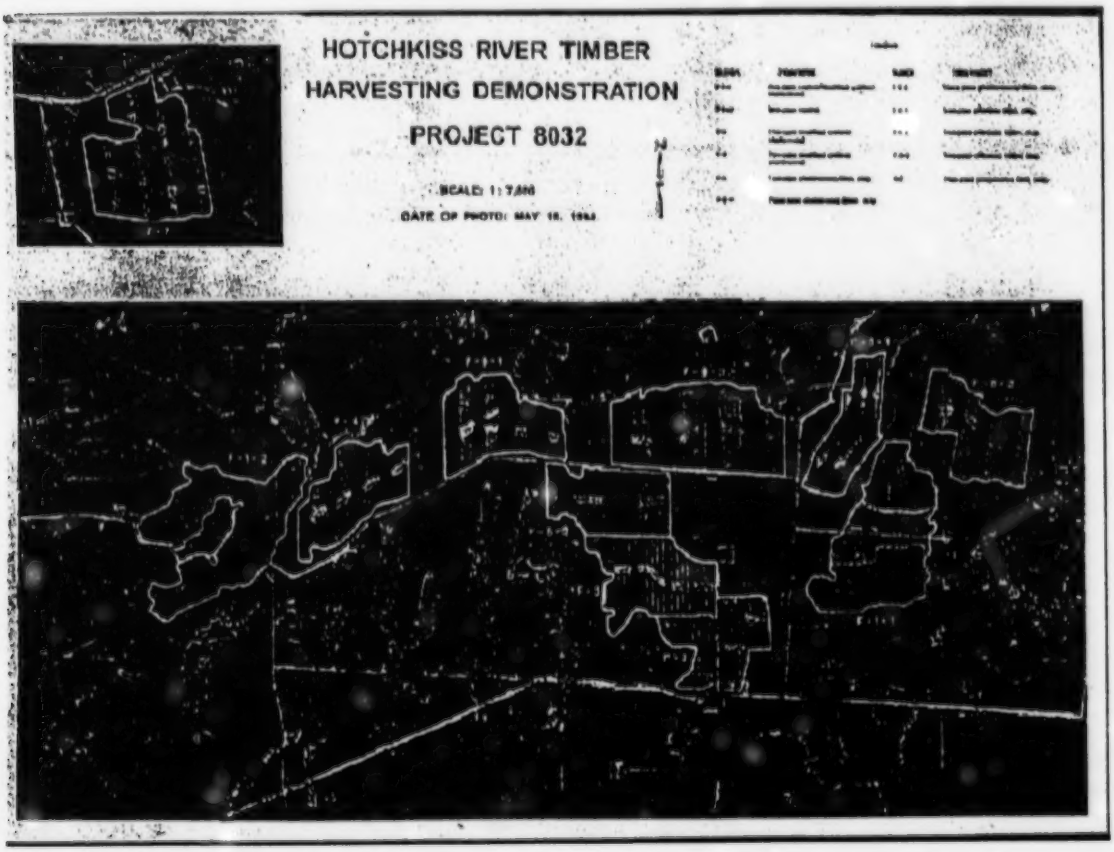
The study used conventional harvesting equipment to test eleven harvesting and silvicultural systems designed to protect and minimize wind damage to immature white spruce residuals and encourage vigorous hardwood regeneration following harvest of the aspen overstory. Research areas include wind damage, wind firmness and growth response of the immature white spruce, effects of harvesting disturbance and timing on soil properties, conifer and hardwood regeneration after harvest, efficiency of equipment and harvesting costs, modelling of wind flow and long-term growth and yield.

A two-stage harvesting and tending model proposed by L. Brace and I. Bella of the CFS in 1988 was adopted at the Hotchkiss site to protect white spruce during the harvesting of aspen. Results show that up to 60% of the residual spruce can be protected during the harvest of overstory deciduous trees. Other advantages of the model include the maintenance of structural diversity and natural visual appeal of the forests.

In the prairie provinces there is a desire to use natural regeneration systems to reduce rotation length and provide alternatives to traditional clearcutting. The two-stage model may help different companies with holding rights to the deciduous and coniferous trees on the same land base, to more efficiently coordinate their harvesting and stand-tending activities. If ways can be found for dealing with both species on the same land base management for both conifer and deciduous users can be improved. The results of the Hotchkiss River project will help in designing harvesting patterns that protect coniferous understoreys from wind throw and also help identify the costs and benefits of doing this.

Already in its seventh year, the project has a planned 20-year series of harvests and surveys. Technology transfer is an important component of this study for delivery and promotion of research results on behalf of the proponents and all related research collaborators. Products include demonstration maps and field guides, self-guided tour trails with interpretive signage and field tours (including active operations) as required.

Figure 1. Aerial photo mosaic of the Hotchkiss River study site in 1994 following first-pass harvest.



JUNIOR FOREST WARDENS

A Little History

In 1930, the Junior Forest Wardens were established to help prevent forest fires. The goal was to educate young people, and through them, educate their parents. The program was originally only for boys, but it soon changed to welcome girls too. In 1985, the program was broadened to focus more on forestry, woods-travel, ecology, and leadership.

In 1960, the Junior Forest Warden program officially started in Alberta under the sponsorship of Land and Forest Service, a division of Alberta Environmental Protection.

About the Program

The Junior Forest Warden program is open to boys and girls from ages six to eighteen. Clubs meet regularly, usually during the week, and augment their program with weekend activities such as campouts, canoe trips, nature study and primitive crafts.

Joining the Junior Forest Wardens provides young people with positive learning experiences designed with their interests in mind. Wardens will find themselves involved in many challenging and rewarding activities, while developing into more informed and responsible adults. The program fosters an appreciation of our natural resources through hands-on experience.

Some projects in which clubs get involved include fish habitat enhancement, reforestation, and wildlife conservation. Wardens soon become comfortable in the outdoors as they learn skills for safe and enjoyable outdoor experiences. Wardens may have the opportunity to participate in a wide variety of outdoor activities: hiking, camping, fishing, canoeing, rock climbing, cross-country skiing, and more

Adult Involvement

Junior Forest Wardens provides an opportunity for the whole family to get involved. Parents attend meetings and outings with their children. There are also opportunities to help at club functions such as camps, hikes and field trips. This is a chance for the whole family to do something together. We are always looking for adults to start up and lead clubs in your community. All we really need are dedicated people with a genuine interest in leading youth, and the enthusiasm to make learning fun.

For More Information

Call one of the club leaders near you, if you and your family are interested in the Junior Forest Wardens. There are clubs in northwest Alberta in Peace River (call Dianne at 332-1337), Manning (Al at 836-3764), Cadotte Lake (Lance at 629-3741), Falher (Jeanette at 837-2736), High Prairie (Mary Lou at 523-5536), Slave Lake (M.J. at 369-2001), and Grande Prairie (Diane at 568-3451).

If you are interested in more information about the program, or about how to set up a club in your area, contact Rick Moyse, Regional Coordinator for JFW's in northwest Alberta,, at 624-6575 (toll free access 310-0000).

Lesser Slave Lake Bird Observatory

By Frank Fraser

The story of the Lesser Slave Lake Bird Observatory (LSLBO) is about partnerships. It is a partnership between Alberta Environment, the Forest Industry, the Tourism Industry, the Not for Profit sector, and the Ornithological community. As an important member of the ornithological community, the LSLBO became a full member of the new Canadian Migration Monitoring Network (CMMN) in 1999.

Alberta Environment staff provide administrative, maintenance, leadership, scientific, interpretive, in-kind donations, and volunteer management support. The department and the LSLBO have entered into a long-term Memorandum of Agreement that expires in October of 2001.

The Lesser Slave Lake Bird Observatory is Canada's northernmost migration monitoring station. As with other groups of birds in North America, there is a great deal of interest in determining the conservation status of boreal migrants. Global warming, destruction of tropical wintering grounds, logging, fires, and other environmental changes can change the long-term health of these species. Indeed, a number of recent analyses, based on data from monitoring programs, indicate widespread and severe declines in some boreal nesting migrants. Since up to 75% of vertebrate life in the boreal forest is composed of migratory birds, it is important for Alberta Environment to support the LSLBO. A vast majority of migrant birds spend the winter months in Mexico, the Caribbean, Latin America, and a few species go as far as Panama, Columbia, Venezuela, Ecuador, and even Argentina. The LSLBO project provides critical information about presence/absence, the life expectancy, survivorship and productivity, and migration routes of boreal forest bird species. This benchmark data, in turn, allows land managers to design and implement better management practices.

The LSLBO also links the science of monitoring land-birds and the art of presenting meaningful and revealing conservation programs. It is a creative partnership that combines an intensive landbird monitoring program with a Provincial Park conservation education program.

The LSLBO staff and Provincial Park naturalists present guided bird hikes, bird banding demonstrations, amphitheatre programs, and an annual Songbird Festival (the first weekend in June) that expose park visitors, local community groups and individuals, schools, walk-in clients, and VIPs to important ecological principles and processes.

Our long-term goal is to build a research and interpretive centre on the disturbed site of the former staff housing in Lesser Slave Lake Provincial Park. We anticipate that the cost involved is 1.5 to 2.0 million dollars. The facility would provide research, administrative, classroom and volunteer space. It would also include accommodations for scientists, LSLBO field staff, and long-term and short-term volunteers.

Visit the new LSLBO website at: http://www.lslbo.org

Northern Watershed Project

Submitted to: Forest Explorers 99
Submitted by: Northern Watershed Project Research Team

During the last several decades the boreal forest natural regions of Alberta have undergone significant changes with the development and continued expansion of forestry, oil and gas, agriculture, mining and human-related infrastructure (e.g., towns, roads, electrical). These anthropogenic disturbances combined with natural disturbances of fire, flooding, wind events, and pest outbreaks dramatically alter the landscape and the biotic communities that it supports.

If one accepts that ecological integrity of terrestrial and aquatic systems are tied to an appropriate frequency, intensity and scale of perturbations, it becomes important to understand how disturbances drive forest succession, how patterns in forest attributes are distributed across the landscape and whether forest attributes are linked with aquatic communities. The ability to quantify the ecological effects of anthropogenic and natural disturbances within appropriately large spatial scales and long time frames would greatly assist with the management of Alberta's boreal.

The Northern Watershed Project is a three-year, multi-stakeholder initiative whose objective is to assist government and industry to understand the role of disturbances on forest and aquatic resources of northwestern Alberta. The project is currently in month 7 of Year 1 (i.e., 1999-2000). The NWP is funded by the seven industrial and government partners of Alberta Environment, Alberta Conservation Association, Alberta Research Council, Alberta Pacific Forest Industries, Daishowa-Marubeni International, Manning Diversified Forest Products and Trans Canada Pipeline.

The project comprises three inter-related study components whose objectives are:

1. To quantify the landscape variation in the riparian gradients using physiography and vegetation of natural stream riparian gradients within lower foothills and dry mixedwoods subregions of the Notikewin watershed (Component 1 - Upland and riparian forests)

2. To develop predictive models relating fish community structure with watershed attributes in the Notikewin basin (Component 2 - Relationships between watershed characteristics and fish communities)

3. To determine the cumulative effects of watershed disturbances on fish communities in the Kakwa and Simonette watersheds (Component 3 - Cumulative effects of watershed disturbances on fish communities).

Results from these projects will assist with the development of detailed forest management plans and to operational planning and practices used by the Oil and Gas sector.

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Snowshoe Hare Damage to Conifer Seedlings in Cutblocks

Presented by The Alberta Research Council, October 28, 29 1999

RESEARCH PARTNERS

Alberta Research Council	Vegreville, AB	Jack Nolan & Larry Roy
Alberta Lands and Forest Service	Manning, AB	Ken Yackimec
Manning Diversified Forest Products Ltd.	Manning, AB	J.P. Bielech
Millar Western	Whitecourt, AB	Richard Krygier

Mixedwood Management Working Group (Potential) Weyerhaeuser and Al-Pac (Models)

BACKGROUND

- Snowshoe hare populations can fluctuate from <1 per km to >1000 animals per km over a 10 year cycle.
- The population crash occurs abruptly after a 3 year high and results from a combination of starvation, predation, and physiological and climatic factors.
- During the 3 year high, white spruce seedlings may suffer from severe browsing that cause growth setback or may kill trees.
- Snowshoe hare damage to coniferous regeneration may have serious impacts resulting in failures to meet regeneration standards.

RESEARCH OBJECTIVES

- Determine the population phase of the snowshoe hare cycle to ensure that the study coincides with the snowshoe hare peak.
- Develop a short-term risk assessment model that can be applied by forest companies to select cutblocks to be treated to reduce hare damage.
- Develop a long-term risk assessment model that will be used by forest companies to plan cutblock layout to minimize future impact by snowshoe hares.
- Evaluate the effectiveness of a single aerial application of Vision™ to protect white spruce seedlings from hare damage over this three year population peak.

METHODS

Population Assessment

- The snowshoe hare population will be determined by winter track counts established in low, moderate and high quality habitats.
- Poor hare habitat of mature aspen and spruce will be used to monitor changes in tracks density between years, to predict future peaks.

Risk Assessment Model

- Models will be developed using existing literature and information collected from past research at ARC.
- Models will be validated using the percentage of white spruce seedlings browsed by hares at selected low, moderate and high risk cutblocks.
- Data collected will be used to build models to assist forest managers in selecting cutblocks at high risk to hare damage during future peak years.

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Cutblock Treatment

- "High risk" cutblocks, those with dense cover for hares will be chosen for treatments.
- Two cutblocks will be sprayed with an aerial application of Vision™ and two cutblocks will be selected as controls (no spray).
- Damage to conifer seedlings will be assessed during early spring surveys.
- The difference in browsing damage before and after treatment and between treatment and control cutblocks will be used to evaluate the effectiveness of herbicide treatments.

RESEARCH OUTCOMES

- Determine hare population status and set-up long term monitoring transects
- Develop spatial risk assessment models
- Develop models for long term planning
- Evaluate effectiveness of controlling hare damage with Vision treatments in cutblocks

Stand Structure and Folivore Dynamics in Northern Spruce Stands

John R. Spence, Lisa Cuthbertson, Julia Dunlop & Louis Morneau
University of Alberta, Edmonton

W. Jan A. Volney, David W. Langor & Ken I. Mallett
Natural Resources Canada, Northern Forestry Centre, Edmonton

Conservation of 'biodiversity' is now widely accepted as a prime indicator that natural systems are being maintained in a "functionally integrated state". However, we are profoundly ignorant of the biodiversity that we have agreed to protect under the Rio Convention. Insects and fungi are among the most abundant and speciose components of biodiversity, but they are also the least well understood. A small proportion are agents of depletion that, under outbreak conditions, can dominate forest processes, overwhelm productivity, subdue other processes and organisms that depend upon them, and steadily diminish the economic value of the forest. Thus, the trick is how to do forestry in a way that conserves this diversity but does not let the "bad players" get out of hand.

Our work focuses on arthropod populations feeding on mature white spruce, especially defoliators and their natural enemies, and how their abundance and impact changes with ecosite, impact of tree diseases and the harvest and burn treatments applied under EMEND. Phytophagous insects are numerous in forest canopies, provide critical food resources for higher order consumers, like songbirds, but also are crucial to ecological functions that regulate forest production. Under the forest health concept, we recognize defoliators, like the spruce budworm, must be present, but we also seek to ensure that management prescriptions do not promote outbreaks that diminish production and perhaps cause stand break-up. Populations of defoliators are held in check mainly by natural enemy populations, and so we should prefer forestry practices that conserve parasitoids and their regulatory impacts. Thus, both defoliators and their natural enemies are critical components of biodiversity that are functionally connected to sustainable forestry through the concept of forest health.

We have sampled larval defoliator populations on dominant white spruce felled in both pure and mixed wood stands; in the mixed wood setting, we've also felled and collected arthropods from dominant aspen trees. Samples have been taken both before and after the EMEND harvesting treatments. Samples of larvae have been reared at the field camp 1) to establish and photograph larval-adult associations that will support unambiguous identification and 2) to collect parasitoids active at the time of collection, establish host-parasitoid linkages and estimate rates of parasitism. Foliage, disc and root samples are being taken and will be tested for the presence of common diseases that may be associated with insect attack. Adult moths active in the stands have also been sampled by dusk-dawn light trapping. These results will be compared with those from canopy sampling to provide a solid and badly needed estimate of quantitative relationships between light trap catches and defoliator feeding in northern forests. The light trap data will also provide the data required for a more complete assessment of biodiversity impacts of the EMEND treatments. Light traps, of course, will provide data about lepidopterans feeding on plants within these stands other than the dominant canopy trees.

Terrestrial and Riparian Organisms, Lakes and Streams (TROLS) Presentations

Oral Presentation: Roles of Buffer Strips in Riparian Zones
Speaker: Dr. Ellie Prepas

Poster Presentation: The Role of Buffer Strips for Maintenance of Terrestrial, Riparian and Aquatic Communities in the Boreal Plains.
Presenters: Ellie Prepas, Ellen Macdonald and Mark Serediak.
Poster Prepared by: Matt Wheatley

Current forest practice codes in Alberta dictate that forested buffer strips be left around lakes and along permanent watercourses following forest harvesting. The aim of this practice is to protect receiving waters and concurrently preserve riparian forest habitat. However, there is little information available to suggest that these objectives are met nor that currently used buffer strip widths are optimal for these purposes. The Terrestrial and Riparian Organisms, Lakes and Streams (TROLS) Research Project is designed to provide a scientific basis for riparian buffer strip management by developing an understanding of:

1. The ecological function of riparian forests
2. The effects of buffer strip creation on the conservation potential of riparian forests
3. The processes by which terrestrial and aquatic ecosystems are connected
4. The impact of forest harvesting on the function of aquatic ecosystems

The TROLS project consists of experimental forest harvesting replicated around lakes and streams in the boreal forest of north-central Alberta. TROLS has four components, Lakes, Streams, Terrestrial and Hydrology, for which data have been collected around our lakes and streams both pre and post-harvest. Field work includes the summers of 1995-1996 (pre-harvest), and 1997-1999 (post-harvest). As a contribution to sustainable forest management, our goal is to provide recommendations on policy and management with respect to riparian buffer strips.

TROLS consists of a team of 13 Principal Investigators, from five institutions, each with expertise in one or more areas of biology and forest science. There are 22 graduate students conducting research in the study area, of which seven have completed their post-graduate degrees. Four full time research coordinators handle the day-to-day operation of the project. In addition, the project has employed well over 100 summer students and temporary staff since 1994.

With the final summer of data collection completed and analysis underway, TROLS is working toward its final goal of integrating the data and releasing its findings. Not surprisingly, proposed approaches for management of riparian areas may deviate from the fixed width buffer strip approach. Terrestrial studies are indicating that the riparian buffers around lakes are not necessarily unique in terms of vegetation or small mammal habitat but that the transition zone from the forest to the lakeshore may be unique and serve as very important habitat for small mammals and amphibians. Riparian buffer strips narrower than 100 m are poor reserves for small mammals, songbirds and amphibians. Riparian forests do serve as important wildlife travel corridors and the width of the buffer influences animal movements. Lake

responses to harvested buffers have shown no short term changes in fish communities, although lake nutrient levels do show an increase, which may lead to increased algal biomass, including non-desirable cyanobacterial species. Cumulative effects are a concern for the long term. Interrelationships between watersheds, along with internal lake features, particularly depth and aspects of water mixing will determine the extent of biotic impact on aquatic bioindicator species and habitat for all aquatic life. Each lake may have a unique relationship with its watershed features, including extent of disturbance, relative size, vegetation and subsurface flow, affecting the extent of biotic impact on its aquatic systems. Stream studies show a direct relationship between increased nutrient input and algal productivity.

White Spruce Regeneration in the Boreal Forest

Principal investigator: Jim Stewart, Canadian Forest Service
Principal collaborators: Rick Hurdle and Derek Sidders, CFS, and Dan Gilmore, U. Minn.

An Introduction to EMEND

In 1997, a large scale experiment was initiated NW of Peace River, Alberta with the purpose of researching forest topics related to Ecological Management by Emulating Natural Disturbance (EMEND). The main objective of the EMEND project is to study the biodiversity, ecosystem function and productivity of various forest types under different fire and harvesting regimes. Harvesting treatments were clearcuts and partial cuts leaving residual densities of 10, 20, 50, and 75% of the original forest. Burning of EMEND stands is currently underway.

EMEND Silviculture Studies

For the EMEND project to have an operational value, silvicultural tools and techniques for promoting regeneration must be developed and tested. To this end, four site preparation treatments (mounding, mixing, scalping, and an untreated control) were applied in the clearcut, 50% and 75% harvesting regimes. White spruce seedlings were planted, and white spruce seed was applied to the different site preparation treatments. Natural cone crop production and seed rain are also being sampled throughout the different EMEND harvesting treatments. Other researchers are studying the response of natural aspen regeneration to harvest treatments in the different forest types.

Microclimate Monitoring

Ultimately, researchers would like to determine the relationship between seedling performance and microclimate conditions produced by the harvesting and site preparation treatments. Physiological measurements of seedlings will aid in linking the microclimate differences to seedling development characteristics. At EMEND, microclimate monitoring encompasses the measurement of radiation (sunlight), relative humidity, air temperatures, soil temperatures, and soil moisture.

Growth and Physiological Measurements

Over the life of the EMEND project, we will continue to observe the survival, growth, and physiological characteristics of the white spruce germinants and seedlings. Measurements will include seedling heights, diameters, nutrient contents, photosynthetic and respiration rates, water content and use.

Cone Crop Production and Seed Rain Measurements

Natural regeneration of white spruce depends on seed produced by nearby trees. The size of the cone crop can be affected after being released from competition by partial harvesting. This study compares cone crops of trees in different crown classes (dominant, codominant, intermediate and suppressed) across the range of residual stand densities. The presence of residual trees in the stand can reduce the distance the seed flies, and affect the distribution of seed in harvested blocks. The amount of seed rain will be related to the number of naturally regenerating seedlings found in the silviculture plots.

Windthrow Monitoring

Trees in a natural stand provide each other with mutual protection from the wind. After partial harvesting, windthrow can be a significant cause of mortality in the remaining trees. At the EMEND site, windthrow is being monitored to test a vulnerability rating system based on species, tree form (H/D ratio), residual density, and site conditions (e.g., topography, moisture).

Woodland Caribou Research Program

A Knowledge-based Conservation Plan for Northern Alberta's Woodland Caribou

BACKGROUND:

Woodland caribou are listed as an endangered species under the Alberta's Wildlife Act. Therefore, it is a priority of all Albertans to conserve and maintain caribou populations and habitat in their boreal landscape.

The Boreal Caribou Committee (BCC; 1999) resulted from the merger of the Northeast (NERSC; 1991-1999) and Northwest (NWRSCC; 1994-1999) Regional Standing Committees on woodland Caribou. The committees were formed from the will to develop a caribou conservation plan that was founded on scientific knowledge. The BCC represents industrial users and provincial government land and wildlife managers supporting a government / industry / university / community forum to discuss the relationships between resource development and the conservation of woodland caribou. The goal is to integrate industrial activities in northern Alberta with the management and conservation of caribou and caribou habitat. Presently caribou populations appear to be stable to slightly declining.

The Boreal Caribou Research Program (BCRP) was formalized in 1996, but has roots in the NERSC research sub-committee (1991). Members of the research sub-committee represent the full spectrum of BCC partners. This research partnership provides an efficient and co-ordinated approach to understanding issues affecting northern Alberta caribou ecology. University researchers serve a key role in the BCRP; conversely, students are provided with a unique learning opportunity as they work on applied research questions. Results of research are used by provincial regulatory agencies to develop and implement effective and practical landuse guidelines. The program has been recognized provincially and nationally as a successful model of co-operation and collaboration that advances caribou conservation efforts.

RESEARCH AND GUIDELINES:

The research program seeks to understand population dynamics, predator-prey interactions, habitat use, and the effect(s) of industrial activity on woodland caribou. Current research projects focus on understanding the effects of linear corridors and other development activities on movements, habitat use, and population dynamics. The BCRP drives an adaptive management program that periodically reviews landuse programs in relation to newly acquired information. Annual workshops re-align land-use strategies with current knowledge.

FUNDING & COMMUNICATION:

Fund-raising and communication are key processes required to ensure successful implementation of this conservation program. Funding to date has been predominantly through industrial contributions. Several government grants (provincial and federal) have also supported research efforts. Open and effective communication is critical to the successful development of this program. Communication of the partnership process and the results of the research program have been achieved through a variety of forums including pamphlets, an annual newsletter, a web-site, conference presentations, progress reports and publication in peer-reviewed journals. Communications initiatives have been underway since 1997 to involve and educate Albertans about this conservation program. In 1999, production of a short video is a high priority of the communications subcommittee. This film will be an effective tool for communicating with various stakeholders.

For further information on the research and communication activities of the Boreal Caribou Research Program, please contact Dr. Elston Dzus,c/o Alberta Pacific Forest Industries Inc.,
Ph: 1-800-661-5210 or email: dzusel@alpac.ca
Check out our website http://www.deer.rr.ualberta.ca/caribou/bcrp.htm

Woodlot Association of Alberta

Promoting Leadership in Sustainable Forest Management

Who Are We?
The Woodlot Association of Alberta is a non-profit organization established by woodlot owners. It is run by a volunteer board of directors representing various regions in Alberta.

Our Mission
Our purpose is to promote leadership in sustainable forest management by encouraging the development of private and public forest by increasing awareness of their inherent social, economic and environmental values.

Our Goals
- To educate the public about the inherent value of Alberta's private forests.
- To promote private forest management in an environmentally sensitive way.
- To facilitate education and training of members in woodlot-related activities.
- To help members make informed decisions about their woodlots.
- To represent members and liaise as a body with industry, government and other likeminded organizations.

What is a Woodlot
Any trees on your property, regardless of their size, are part of your woodlot. This includes naturally occurring trees as well as ones you planted yourself.

Woodlots vary in size from large tracts of forest and wooded pasture to small shrubby bluffs and shelterbelts.

Why Manage Your Woodlot?
Woodlots are managed for several reasons:
- To produce products such as lumber, pulp wood, posts, wild food and decorative materials.
- To complement existing crop and/or livestock production (agroforestry).
- To enhance wildlife habitat.
- To provide recreational opportunities.

Many owners manage their woodlots for more than one purpose. The Woodlot Association of Alberta can provide you with information to help you understand the value of your woodland resource and develop an integrated management plan to enhance its potential.

For More Information
Woodlot Association of Alberta
14815 - 199 Avenue Edmonton, Alberta T5L 4W2
Call Toll Free 1-800-871-5680

wood WORKS!

engineered for strength and style...*naturally!*

Industry led initiative to promote the use of wood in commercial and public construction through information, education and technical assistance.

Wood *Works*! is a national industry led initiative, spearheaded by the Canadian Wood Council, to promote the increased use of wood in commercial, industrial and institutional construction. The project showcases the advantages of wood construction to design and construction professionals, senior policymakers and the general public to encourage them to Think Wood! The project backs up its Think Wood! message with technical assistance, education and design tools. (see reverse)

The project is being launched in Alberta in April 1999 with the Calgary Wood Solutions Fair - a one day event dedicated to wood construction. The Wood Works project is partnering with Western Wood Truss Association of Alberta and industry partners to assist designers and builders to learn more about the advantages of using wood including:

NEW OPPORTUNITIES: New code changes have increased the type and sizes of buildings which can be constructed of wood and new engineered wood products have provided greater design flexibility and increased opportunity for wood products to penetrate the commercial market.

COST SAVINGS: Numerous case studies have proven that building with wood is cost-effective in commercial construction. Three recently built schools in BC resulted in a $700, 000 savings when built with wood as opposed to steel. Several other buildings have experienced this same economic benefit.

ENERGY EFFICIENT: Wood is 40% more thermally efficient than steel. This means using wood in construction reduces your heating costs while providing beauty, strength and versatility.

RENEWABLE: Wood is renewable and plentiful with less than 0.4% of Canadian forests harvested annually. Wood is replanted (over 600 million seedlings a year) in a continually regenerating cycle unlike the non-renewable resources of iron ore. Wood requires much less energy to manufacture, produces much less air and water pollution and helps in combating the greenhouse effect.

The forest industry is Alberta's fourth largest manufacturing sector with annual sales of $3.2 billion. The Alberta forest industry is a major source of employment in over 50 Alberta towns and cities accounting for 35% of jobs in small town Alberta and 38. 000 jobs provincially.

THINK WOOD!

THE CANADIAN WOOD COUNCIL

The Canadian Wood Council (CWC) is the national federation of wood product associations. Through its Member Associations, the Council represents approximately 1200 Canadian manufacturers of lumber, plywood, oriented strandboard, treated wood, glulam and trusses.

CWC's vision defines the role of the Council within our industry. The Mission reads: *"to ensure market access in order to maintain and expand markets for Canadian wood products in North America."*

The Mission is accomplished by working with building codes and standards and by developing and communicating technical information to the specifying community.

CWC's work in codes and standards involves working with regulatory authorities throughout North America. The objective is to ensure access of wood products in buildings regulated by structural, fire, acoustic and energy criteria, and to ensure that code requirements remain practical and affordable. Examples of codes and standards work include increasing the area and height permissible of certain wood buildings, reducing the separation required between buildings, adding the option of building with wood through the use of sprinklers, etc.

CWC's technical information flows from the codes and standards work and from independent research and analysis of wood attributes and building systems performance - the purpose being to make it as easy as possible to specify wood. Examples include reference manuals, software, case studies, fact sheets, etc.

Since its inception, CWC's publications have enjoyed a high level of credibility with architects, engineers, builders, educators and building officials. These are the professionals who play an important role in the selection and use of building materials. It is essential that those who specify wood have a thorough understanding of its value and use in the practice of these disciplines.

Accordingly, CWC is proactive in communicating with the specifying community. This includes market research, education initiatives and trade shows.

In Canada, CWC co-ordinates its activities with allied groups such as Forintek and the Institute for Research in Construction (part of the National Research Council). Joint initiatives include fire and sound tests to create methods for improving fire, structural, and acoustical performance of wood-frame floors and walls.

In the United-States, CWC participates in and leads joint venture activities. They include market access work, market research initiatives and research in codes and standards to address issues such as high wind and seismic concerns. This is accomplished through membership in the American Wood Council and participation with the Wood Products Promotion Council.

Environmental issues also have direct market access implications. CWC communicates information on the environmental attributes of wood products and is a Member of the Canadian Sustainable Forestry Certification Coalition.

CWC was incorporated as a non-profit corporation in 1960. The head office of the Council is situated in Ottawa, Ontario.

WoodWorks! ALBERTA PROJECT CO-ORDINATION OFFICE
Tammy Day, Phone: (780) 831-8575 Fax: (780) 539-7977 Email: aware@telusplanet.net

Manning Diversified Forest Products (MDFP)
Research Trust Fund
Complete Project Listing – 1995/96 to 1999/2000

1995/96 ** Completed

# Since Startup	Project #	Researcher/Organization	Project – Short Title	Start Date	Finish Date	Funding Provided (Total amount received since start)
1.**	-	MDFP Trust Fund Committee	Wood Residue Workshop	1995	1995	$ 250.
2.**	MDFP5/95	V. Lieffers – U of A	Calamagrostis canadensis study	1995	1996	$ 37,580.
3.**	MDFP6/95	P. Hvenegaard – NRS-ACA	N.W. Alberta Cooperative Fisheries Inventory	1995	1998	$145,500.
4.**	MDFP17/95	L. Makiaho – MDFP	Process Model Operations.	1995	1995	$ 11,000.
5.**	MDFP18/95	N. Boucher – MDFP	Thin MDF panelboard study	1995	1995	$ 7,250.
6.**	MDFP7/95	E. Prepas – U of A	Effects of Harvesting on Small mammals and birds	1995	2000	$120,000.
7.**	MDFP13/95	J. Traynor – Foothills Model Forest	Watershed Assessment Model	1995	1997	$ 20,000.
8.	MDFP16/95	Kaufmann Pacific-Fairview College	Boreal Wood Centre – Manning	1995	2001	$270,000.
9. **	MDFP21/95	Northwest Regional Standing Committee on Caribou	Caribou monitoring and inventory in N.W. Alberta	1995	1999	$ 15,000.
10.**	MDFP22/95	J. Volney – Canadian Forest Service	Spruce Budworm Impacts in the Hawk Hills	1995	1998	$156,000.
11.**	MDFP28/95	R. Bonar – Foothills Model Forest	Pileated Woodpecker Study.	1995	1997	$ 26,000.
12.**	MDFP30/95	Econotech Services Ltd.	Pulp quality of fire burned aspen	1995	1995	$ 4,000.

Manning Diversified Forest Products (MDFP)
Research Trust Fund
Complete Project Listing – 1995/96 to 1999/2000

1995/96 contd.

# Since Startup	Project #	Researcher/Organization	Project – Short Title	Start Date	Finish Date	Funding Provided (Total amount received since start)
13.	FDRP5/95	E. Prepas/ U of A	Buffer Strips on Riparian Zones	1995	2000	$270,000.
14.**	FDRP9/95	Wilson/Flesch – U of A	Wind Conditions and cutblocks	1995	1998	$ 67,840.
15.	MDFP12/95	N. Dhir – AENV	Genetics and Tree Improvement in the NWB	1995	2001	$298,000.
16.**	MDFP23/95	Feng/ Hillman – CFS	Watershed Characteristics and disturbance – Boreal Forest	1995	1996	$ 10,000.
17.**	MDFP30/95	D. McNabb – ARC	Productivity of Conifer on Severe Fire sites	1995	1998	$ 71,000.
18.**	FDRP20/95	F. Yeh – U of A	Early Validation of Growth Superiority of White spruce	1995	1998	$ 71,800

1996/97 ** Completed

19.**	MDFP5/96	Spence/ U of A	Soil and litter Inhabiting Beetles	1996	1999	$ 33,500.
20.**	MDFP6/96	Blanton / MDFP	Basal Bark Application of Herbicide	1996	1999	$ 44,320.
21. **	MDFP7/96	Blanton/ MDFP	New Herbicides to Control Calamagrostis	1996	1997	$ 5,000.
22. **	MDFP8/96	Hannon/ U of A	Impacts of Logging on Boreal Birds	1996	1999	$ 59,829.
23. **	MDFP9/96	Rothwell/ U of A	Properties of Mixed Mounds	1996	1997	$ 25,688.
24	MDFP13/96	Rowell/ Beaverhill Bird Observatory	Migration Patterns of Boreal Birds	1996	2001	$ 19,000.

Manning Diversified Forest Products (MDFP)
Research Trust Fund
Complete Project Listing – 1995/96 to 1999/2000

1996/97 contd.

25 **	MDFP14/96	Hugh Seaton- BWC	Wood Residue Conference.	1996	1996	$ 10,000.
26.**	MDFP17/96	Dave Buck / Fairview College	Mill By-product study	1996	1999	$ 20,000.

1997/98 ** Completed

# Since Startup	Project #	Researcher/Organization	Project – Short Title	Start Date	Finish Date	Funding Provided (Total amount received since start)
27.	MDFP1/97	Langor/ CFS	Spruce Beetle Epidemiology and Management in NWB	1997	2000	$ 57,000.
28.	MDFP7/97	Borden/ Simon Fraser University – B.C.	Management of Forest Pests	1997	2001	$ 15,000.
29.	MDFP8/97	Hodgetts/Macdonald / U of A	Genetics and Diversity in Lodgepole pine	1997	2000	$ 20,000.
30 .	MDFP9/97	Schieck/ ARC	Biodiversity in Harvested Areas	1997	2001	$ 60,000.
31**	MDFP12/97	Lieffers/ U of A	Model to Predict Understory Light Regime – Mixedwood – Phase 1	1997	1998	$ 19,000.
32.**	MDFP13/97	Junior Forest Wardens	National Campout – Pipestone Prov. Park	1997	1997	$ 5,000.
33.**	MDFP18/97	Hugh Seaton – BWC	Kiln Operators Course – Forintek	1997	1997	$ 5,000.
34.**	MDFP19/97	Hugh Seaton – BWC	Forest Explorers Research Show	1997	1997	$ 7,000.
35.**	MDFP20/97	K. Glover – Boreal Concerns Inc.	Testing the Establishment of the Elite White spruce Hybrids - Supertree™	1997	1997	$ 9,500.
36	MDFP21/97	Hugh Seaton – BWC	Boreal Forest Education Awards	1997	2001	$ 16,000.

Manning Diversified Forest Products (MDFP)
Research Trust Fund
Complete Project Listing – 1995/96 to 1999/2000

1998/99 ** Completed

# Since Startup	Project #	Researcher/Organization	Project – Short Title	Start Date	Finish Date	Funding Provided (Total amount received since start)
37.**	MDFP1/98	Lieffers/ U of A	Refinement of a model to predict Understory Light in Mixedwood stands – Phase 2	1998	1999	$ 21,400
38.	MDFP6/98	D. Moyles/ ACA	Grizzly Bear Inventory in NW Alberta.	1998	2003	$ 35,000.
39.	MDFP3/98	V. Martineau/ GPFCS	Envirothon- Grande Prairie	1998	2000	$ 3,500.
40.**	MDFP7/98	Janet Blayone/ PALS	Envirocards	1998	1998	$ 1,564.
41.	MDFP11/98	Hillman/ CFS EMEND	Timber Harvesting Impact on Soil, water content, temp. and evapotranspiration	1998	2000	$ 55,000.
42.**	MDFP17/98	Hugh Seaton / BWC	Wood Residue Conf. Edmonton	1998	1998	$ 10,000.
43	MDFP16/98	Spence / U of A EMEND	Stand Structure and Folivore Dynamics in White spruce	1998	2001	$ 60,000.
44.	MDFP8/98	O. Rajora / U of A	Effects of Forest Fires/Management on Genetic Diversity of White spruce	1998	2000	$ 40,000.
45.**	MDFP19/98	Grizzly Internet Services	Development of the MDFP Website	1998	1998	$ 1,800.

Manning Diversified Forest Products (MDFP)
Research Trust Fund
Complete Project Listing – 1995/96 to 1999/2000

1999/2000 ** Completed

# Since Startup	Project #	Researcher/Organization	Project – Short Title	Start Date	Finish Date	Funding Provided (Total amount received since start)
46	MDFP1/99	D.W. Gilmore/ University of Minnesota- EMEND	Modeling Early Regeneration Processes in Mixedwood Boreal Species	1999	2002	$ 30,000.
47	MDFP2/99	Weixing Tan / GPRC	Physiological Conditions and field survival of White spruce seedlings	1999	2004	$ 25,000.
48	MDFP 9/99	E. Dzus/ Boreal Caribou Research Program	Integrating Woodland Caribou Conservation and industrial activity in NWB.	1999	2002	$ 20,000.
49	MDFP11/99	Uldis Silins/ U of A	Watertable Level Control by hardwoods in wet spruce sites	1999	2001	$ 30,700.
50	MDFP13/99	Daniel Farr/ Foothills Model Forest	Development of an AB Biodiversity Monitoring Program	1999	2000	$ 20,000.
51.	MDFP14/99	F. Schmiegelow/ U of A	The Response of Forest birds to experimental harvest and burning	1999	2001	$ 17,700.
52.	MDFP15/99	Jim Stewart/ CFS - EMEND	White spruce regeneration in Mixedwood forests	1999	2004	$ 10,000.
53.	MDFP20/99	Jack Nolan / ARC	Prevention of Snowshoe hare damage to White spruce regeneration	1999	2001	$ 25,000.
54.	MDFP22/99	Frank Fraser/ LSLBO	Boreal Forest Land Bird Monitoring – Lesser Slave Lake	1999	2000	$ 7,500.
55.**	MDFP24/99	Hugh Seaton/BWC	Forest Explorers '99 Forest Research Show	1999	1999	$ 9,000.

Manning Diversified Forest Products (MDFP)
Research Trust Fund
Complete Project Listing – 1995/96 to 1999/2000

Total Funding Provided Since 1995/96 - $ 2,455,221.

55 Projects funded since establishment
32 Completed
23 Currently Active in 1999/2000 (As of November 23rd, 1999)

Contact List of Researchers

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Biodiversity Monitoring Program
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Boreal Grizzly Bear Project
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Effects of Fire and Harvest Disturbance on Small Mammals
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Effects of Forest Management on Genetic Diversity
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EMEND Hydrology Study
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Snowshoe Hare Damage to Conifer Seedlings in Cutblocks
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Stand Structure and Folivore Dynamics
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